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INTRODUCTION

1. The administration of the German group in Lomonosov was taken over by the MSP (Ministry for Shipbuilding Industry) in May 1948. The group remained at Menshikov castle. A small naval contingent remained at the castle and occupied relocated offices. [redacted] 50X1-HUM

2. The previous Soviet Naval Ministry administration was replaced by the MSP civilian administration, with a Soviet by the name of MAKSIMOV as the technical director. The administrative head under MAKSIMOV was a Soviet named SMIRNOV. [redacted] SMIRNOV was under MAKSIMOV, instead of on the same organizational level. [redacted] 50X1-HUM

3. The LAWITSCHKA section continued as before with a Soviet TERASOV as the administrative head. The KOLL and GLOEDE sections were combined into a high and low frequency instrumentation section, with a Soviet named MOSKALENKO as the administrative head. [redacted] 50X1-HUM

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[redacted] 50X1-HUM

[redacted] A Dr. GRUDNITSKI was the head of NII-400, while a Soviet named VORONIN was the head of the personnel section of the Second Chief Directorate (Vtoroye Glavnoye Upravleniye), under which the MSP was administered. VORONIN was in Moscow, while GRUDNITSKI was in Leningrad. All orders to the NII-400 were signed by VORONIN. GRUDNITSKI was regarded as a fairly competent physicist. It was rumored that a Soviet by the name of MALISHEV was the Moscow minister of the MSP, a member of the Supreme Soviet, [redacted] 50X1-HUM

RESEARCH PROJECTS CONDUCTED BY GERMANS AT LOMONOSOV BRANCH

4. The KOLL and GLOEDE section now worked on special measuring instruments. The old KOLL section members worked on instruments in the range of frequencies from 0 to 10,000 cps and the old GLOEDE section, on instruments above 10,000 cps and up to 100,000 cps. The Soviet MSP administrators and supervisors were all civilians and had no technical knowledge whatsoever. They were ignorant and of low character, with not a single technician among them. Even though the KOLL and GLOEDE sections had been administratively combined, they were physically separated and the mechanisms of their work went on as before. The following projects were worked on by the KOLL subsection [redacted] during the period May 1948 to December 1952. 50X1-HUM

   a. Construction of the capacity device for the determination of the amplitude of motion of the diaphragm of the shaking table; [redacted] /. 50X1-HUM

   b. Vacuum tube voltmeter for frequencies from 3 to 300 cps and with a range from 1 mv to 300 volts: /see page 9 for the circuit diagram of this instrument with its complete circuit constants./

   c. Frequency meter for range from 5 to 30,000 cps: This design was similar to that developed by AEG for their comparable instruments. /See page 10 for the circuit diagram and constants for this instrument./

   d. Beat frequency oscillator for range from 3 to 300 cps, with a 25 watt output: /see page 11 for the circuit diagram and constants for this instrument/.

   e. Band pass filters from 6 to 30 cps. were of conventional design, and thus, no circuit diagram is given.

   f. Twin beam oscillograph for 5 to 10,000 cps: This instrument used an AEG tube which was the original German tube and not a Soviet copy. This was the only device except the following, in which a non-Soviet tube was allowed to be used. This was due

[redacted]

to the fact that the Soviet tube was not "sharp" enough. [redacted]

g. Sonic spectrometer for range from 5 to 10,000 cps. [redacted]

h. Sonic frequency analyser from 5 to 10,000 cps. [redacted]

i. Sound pressure recorder for range from 5 to 10,000 cps: MARTIN designed the amplifier, which employed enormous negative feedback in order to obtain linearity of response. Amplifications of 150,000 were used. GRAEFE made the crystal calculations and cut the crystals, which were of Rochelle salt. Two hydrophones were used. SEDLER built the receiver. All of the above men were with the GLOEDE subsection. KOLL and PROMNITZ designed the recorder (ink type) [redacted] These were of conventional design, and accordingly, no circuit diagram is being submitted. [redacted]

j. Electrodynamic receiver for the range 3 to 30 cps: This was to have a very low resonant frequency and a very large damping factor. /See pages 6 and 7 for a description of the features of this receiver./ /See page 12 for a diagram of the physical characteristics of the receiver, and page 13 for the frequency characteristics of the receiver./

k. A diode reflex voltmeter; AC, for frequency range from 5 to 300 Mc/s: The range was from 1 to 300 volts. /See page 14 for the circuit diagram and circuit constants of this instrument./ The input resistance was 10^{12} ohms.

l. A DC and AC vacuum tube voltmeter, range 1 to 300 volts, and for a frequency range on the AC part from 5 to 300 Mc/s: Input resistance was 9×10^{6} ohms. /See page 15 for the circuit diagram and constants for this device./

m. A reflex DC voltmeter, input resistance 10^{12} ohms and for the range 1 to 1,000 volts. /See page 16 for the circuit diagram and constants for this instrument./

5. Under the administration of the MSP, the GLOEDE subsection, with the exception of MARTIN, worked on the design and construction of underwater sound apparatus, such as sonic analysers, impulse generators, spectrometers, transducers, etc., and for frequencies greater than 10,000 cps.and up to 100,000

[redacted]

cps. MARTIN worked on the above in the range less than 10,000 cps. The KOLL subsection worked on sonic instrumentation in the region up to 10,000 cps. MARTIN in a sense worked with the KOLL subsection, while administratively being with the GLOEDE subsection. [redacted] 50X1-HUM one project that LUEBCKE worked on was an analysis of the transmission of sound in shallow water. Two Soviets, a man and a woman, came from the parent institute, NII-400, every month to discuss the design and construction of a large sound transmitter. It was to have a constant frequency of 1,000 cps. and an output of 1 kw. It was of the electromagnetic type and utilized components which had been built at Electroacoustic, Kiel. No additional details are known concerning this development. Dr. KLEMKE made some computations on the propagation of electric waves in salt water. He calculated the field intensity due to a cylindrical transmitter. It was generally believed, by the members of the German Oranienbaum group, that the instruments designed and prototypes built were sent to various Soviet scientific instrument manufacturing concerns where they were manufactured in relative small numbers for issue to various naval establishments. However, there was no evidence for this belief. In contrast to the latitude previously allowed KOLL, GLOEDE, and LAWITSCHKA in assigning work to members of their own section, [redacted] the Soviets now made all the individual work assignments, and in general these assignments were fairly intelligently made. 50X1-HUM In contrast to the relative great freedom of movement around Leningrad while under the Naval Ministry [redacted] 50X1-HUM The official reason the Soviets gave for this tightening of the surveillance was that some members of the group had been having meetings with German PW's and possibly were engaged in subversive activities. This was fantastic, since PW's were definitely restricted in movement.

6. About January 1951, the LAWITSCHKA section was separated—physically from the others, and isolated in one room. 50X1-HUM Here they had nothing to do except play cards etc. [redacted] 50X1-HUM at present they are sitting in LAWITSCHKA's quarters still waiting. [redacted] LAWITSCHKA and all members of his section were fundamentally opposed to the Soviets and probably were taken against their wishes to the USSR. 50X1-HUM [redacted] while they were at Karlshorst they probably worked willingly for the Soviets, since they had to make a living and were physically located in their homeland. 50X1-HUM [redacted] two Soviet torpedo test and development groups, one at Feodosia in the Crimean peninsula and the other at Makhachkala on the Caspian Sea. 50X1-HUM Many of the Germans had their personal binoculars with them and many were equipped with a mil scale in one of the oculars. Upon their return to Brest, all such binoculars so equipped were confiscated upon the stated reason that it was illegal to remove such a binocular from the USSR. KOLL never mentioned the DM-1 unit or any possible Soviet developments, or discussed any of his work

 [redacted] 50X1-HUM

while at Oranienbaum. Paul SIMMEL and Eduard LOEWIS were transferred from the LAWITSCHKA section to the GLOEDE section about July 1952. They were returned to the LAWITSCHKA section about December 1952. Ursula DUERING was transferred to the KOLL subsection in July 1952. No reason was given for these transfers. [redacted] Manfred von ARDENNE and Prof. HERTZ published a text entitled "Atoms and the Separation of Isotopes" in 1948 and that both were in the Crimea engaged in atomic developments. 50X1-HUM

SHORTAGE OF RAW MATERIALS

7. The Lomonosov group had serious material and instrument difficulties. The German technicians brought all their personal tools with them. They were far better equipped than the Soviet technicians. The German group had difficulty obtaining very thin Cu sheet of the order of magnitude of 30 to 50 microns. There was no high resistance wire available on the Soviet market, although, strange to say, [redacted] obtain constantan and manganin resistance wire. About 1950 to 1951 we began to receive previously placed orders for small items such as screws, bolts, tubing, wire, aluminium plate, capacitors, composition resistors, etc. The LAWITSCHKA section had particular difficulty in getting material. The electrical qualities were generally very good. [redacted] obtain metallized resistors, but not larger than 10^7 ohms, and only these during 1952. [redacted] continually robbing one instrument to get parts for another, and hoarded old German World War II stocks of electrical equipment like gold, from which [redacted] obtained [redacted] screws, dials, resistances, capacitors, etc. The Soviets had never heard of or seen an alligator clip. Their vacuum tubes before 1951 were all Soviet in origin and bore American tube designations. After 1951 all had Soviet designations. Prior to 1951 [redacted] used vacuum tubes from German World War II stocks [redacted] since they were superior to the Soviet vacuum tubes. After 1950 [redacted] "ordered" to use only vacuum tubes and electrical instruments of Soviet manufacture. The Soviet built vacuum tubes were of very poor quality, as contrasted to our resistors and capacitors. [redacted] able to get Soviet built tubes on the blackmarket, which were always of better quality than those supplied through the Governmental channels, because the Soviet tube manufacturers were interested in channeling the best part of their production to the blackmarket, since they commanded a higher price than if they were sold in a shop. The blackmarket dealer was always interested in a return sale. The Germans frequently had to avail themselves of these blackmarket vacuum tube manipulations. Original U S vacuum tubes could be obtained openly on the blackmarket. For electrical instruments [redacted] had to rely on German World War II stocks which had been brought to the USSR from Karlshorst. After 1951 [redacted] began to get electrical instruments of Soviet manufacture. [redacted] obtained a limited quantity of very good electrical instruments from Tesla, Czechoslovakia. These consisted of oscillographs, frequency meters, and inductance and capacitance bridges. Philips of Eindhoven furnished vacuum tube voltmeters

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0.5 mU to 300 U with a frequency range from 20^{c} to 1 Mc/s. These bore the type designation GM 6005. The best current instrument of Soviet origin, which began to appear after 1951, was one of 100 microampere full scale sensitivity, mirror scale, 1% of full scale accuracy. The best Soviet millivoltmeter was of 100 microvolt full scale sensitivity. [redacted] 50X1-HUM
[redacted] a few multirange instruments of World War II German manufacture, and later some Austrian which carried the name of GOERTZ. These were rectifier instruments, range 1 to 1,000 volts, and 3 milliamperes to 6 amperes, both AC and DC. All Soviet built frequency meters operated on the principle of charging and discharging a condenser (AEG principle), and were good up to 30,000 cps. The Soviet vacuum tube voltmeters were of relative low AC imput impedance and were from 1 mv to 300 volts, with scales in powers of 1, 3 and 10. [redacted] no deterioration or improvement in the quality of the Soviet instruments after 1951. 50X1-HUM 50X1-HUM

8. One big difficulty was the lack of standardization of electrical instruments. Before 1951 [redacted] set aside our least used instrument, and use it as a working standard. [redacted] no standard cells nor resistance standards. After 1951 [redacted] could send electrical instruments to an institute in Leningrad for calibration. [redacted] dubious about the accuracy of these calibrations and had no way of checking them. One big problem was always the decision as to the accuracy of their measurements. This was something that never could be agreed on. 50X1-HUM 50X1-HUM 50X1-HUM

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9. [redacted] machine-shop facilities staffed with Soviet machinists. After December 1952 a German mechanic named GRAHMUELLER, an electrotechnician with the KOLL subsection, established an instrument repair shop. This was a great advancement, since up to that time we had to repair our own instruments.

DYNAMIC RECEIVER

10. The dynamic receiver served for measuring the amplitude and frequency of underwater acoustic vibrations [see page 12]. The receiver consisted of a permanent pot-shaped magnet, in the air gap of which a vibrating coil attached to two parallel springs was located. The magnet was made of the Soviet alloy metal "MAGNICO" which somewhat corresponded to the German composition "OERSITT 500". The magnet itself had the form of a hollow cylinder. The bottom and top plates and the cylinder shaped core were of soft iron. The vibrating coil body consisted of an unslotted hollow cylinder which was provided with an ebonite cover plate. The exterior surface of the vibrating coil cylinder contained a flat groove which holds the windings.

11. The damping of the movement of the vibrating coil which is proportional to the velocity of the coil was achieved by eddy-currents induced in the brass ring by the movement of the vibrating coil in the magnetic field of the air gap. The vibrating coil could vibrate on two parallel, very elastic springs of phosphere-bronze, which were mounted in a vertical plane, and fastened to the vibrating coil cover and the top

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plate. A parallelogram-guidance of the vibrating coil was thereby achieved so that the coil always vibrated in a vertical plane. To eliminate possible damage of the spring system, the vibrating coil was provided with an upper and lower stop, which allowed only a 0.5 mm motion.

12. The springs were initially stressed in order to avoid their excessive bending. The receiver can only operate in a vertical position and was installed in a water-tight hollow sphere made of light metal, which could be anchored on the sea bottom in depths of 20 to 30 meters. A connecting cable led from the submerged sphere to the experimental ship where it was connected to the various measuring instruments.

13. The voltage induced in the vibrating coil windings is proportional to the velocity of the vibrating coil movement relative to the magnet. The receiver works as an inertial-receiver, e.g., the vibrating coil is moved respective to the receiver housing with which it is rigidly connected. The vibrating coil moves only due to its inertia relative to that of the magnet, therefore, there results a non-linear frequency characteristic for the amplitude of velocity of the vibrating coil movement. As a result, the voltage induced in the vibrating coil windings has a non-linear frequency characteristic. The frequency characteristic is shown in the attached diagram.

14. The curve in the diagram represents the ratio V/V_o of the velocity V of the vibrating coil, relative to the velocity V_o of the receiver mounting, as a function of the relative frequency n; n is the ratio of the frequency f to the natural frequency f_o of the vibrating coil. The ratio V/V_o is equal to the ratio U/U_o, where U is the amplitude of motion of the vibrating coil, and U_o, the respective amplitude of motion at infinite frequency.

15. As can be seen from the diagram, the curve has a point of inflection at the relative frequency n=1, and V approaches V_o as a limiting velocity.

16. In order to place the required working range (5 - 30 c/s) of the receiver in the linear part of the frequency characteristic, the natural frequency f_o had to be selected very low, at 3 c/s, and the damping very high, $d = \sqrt{2}$. This damping corresponds to a logarithmic decrement of 2 pi. The choice of this critical damping results in the approximate coincidence of the linear part of the curve with the natural frequency, or, in other words, the natural frequency is placed as near as possible to the lower limit of the working range.

17. It is necessary to choose the natural frequency as high as possible because it is technically impossible to set it at lower than 3 - 4 c/s. The deviation (error) from the linearity amounts to 29% at the natural frequency 3 c/s, to 6% at 5 c/s, to 1% at 8 c/s. From 10 c/s upwards the deviation (error) is not measurable.

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[redacted]

WORKING CONDITIONS

18. The MSP technical director MAKSIMOV was a cad. He had all sorts of little intrigues going on continually. If the German personnel disobeyed some trifling restriction or regulation, MAKSIMOV arbitrarily imposed a monetary fine of some sort, which was then withheld from our biweekly salary. [redacted] GRAEFE [redacted] once wrote to the MSP personnel director in Moscow, VORONIN, concerning these intrigues of MAKSIMOV, but nothing ever came of the complaint. In December of 1952, LAWITSCHKA was ordered to Moscow for several days where he made complaints of an administrative nature but nothing constructive ever came of this either. [redacted] the best way to get along with the Soviets was to become bombastic and vociferous upon the initial and every subsequent attempt by the Soviets to take advantage of the Germans. This seemed to be the only course of action which the Soviets respected. Many of the German group remonstrated [redacted] attitude and actions in this matter, fearing that it might cause repercussions and retaliations against them all, but such was not the case, [redacted] since apparently [redacted] action had been enough of a nuisance value to make [redacted] a strong contender for first place on the repatriation list. GRAEFE followed this same course of action.

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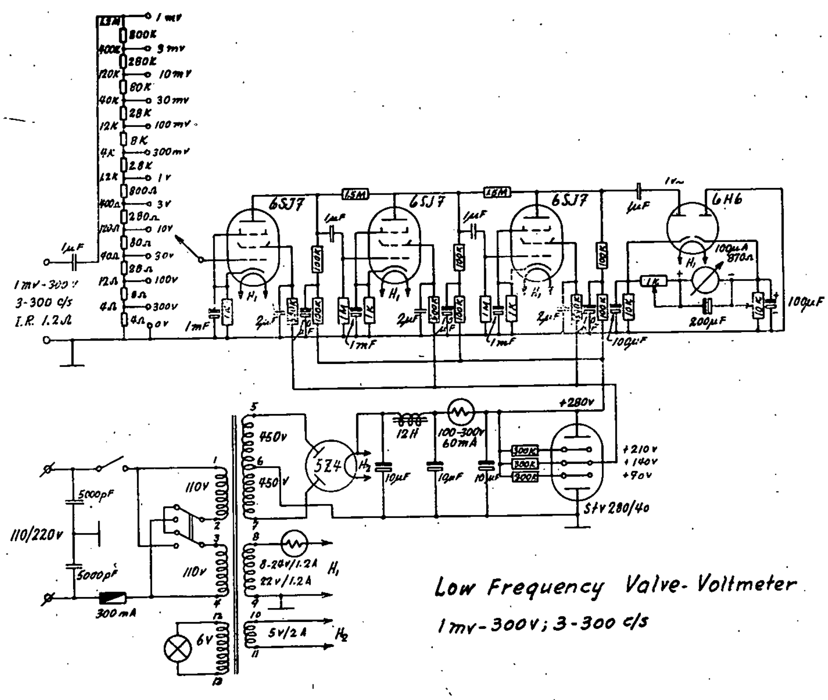

Low Frequency Valve-Voltmeter

1mv-300v; 3-300 c/s

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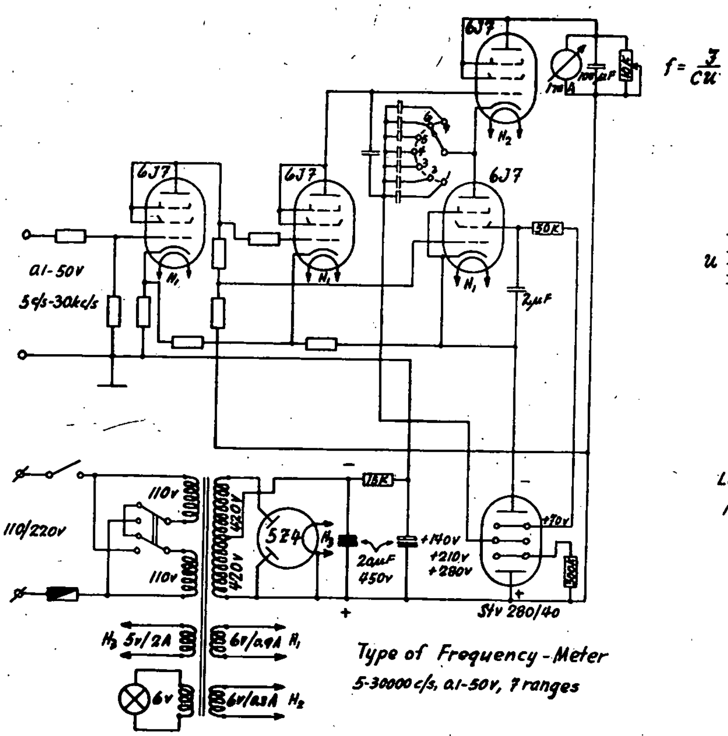
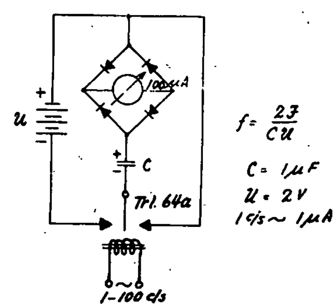


Type of Frequency-Meter
5-30000 c/s, 0.1-50v, 7 ranges



Low Frequency Meter
1-100 c/s, 0.1-1 v

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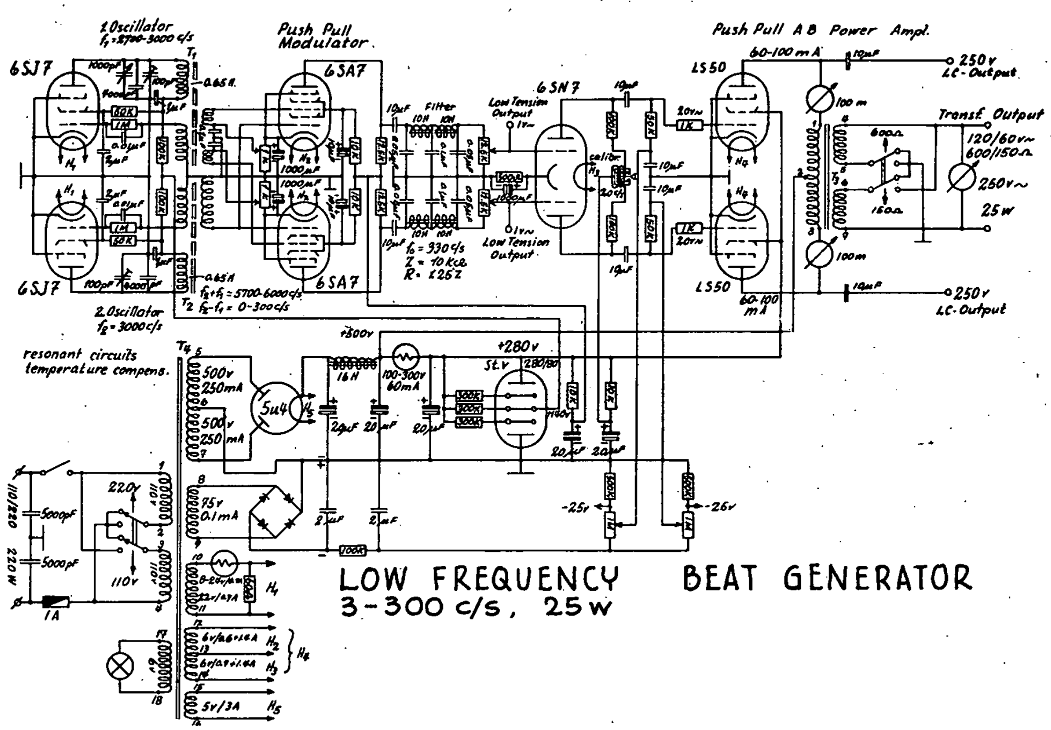

LOW FREQUENCY BEAT GENERATOR
3-300 c/s, 25 w

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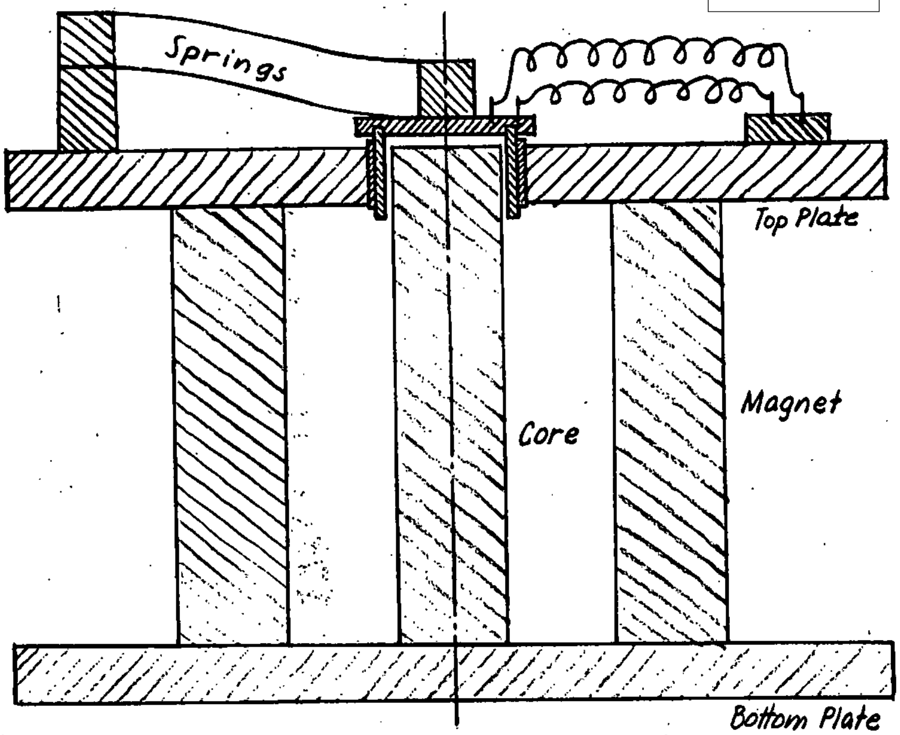

Full Size

Dynamic Receiver

Magnet	"Magnico"
Bottom and Top Plates	Soft Iron
Moving Coil	Brass
Number of Windings	$n = 1000$
Length of Wire	$l = 100 m$
Natural Frequency of moving coil	$f_0 = 3$ c/s
Damping related to nat. Frequency	$d = \sqrt{2}$
Logarithmic decrement	$\vartheta = 2\pi$
Range of Frequency	5-30 c/s
Air gap flux	$B = 10{,}000$ G
Sensitivity	$M = Bl = 50$ V/m/s
Error at 3 c/s (nat. freq.)	29%
" " 5 c/s	6%
" " 8 c/s	1%
Weight (without sphere)	about 10 kg

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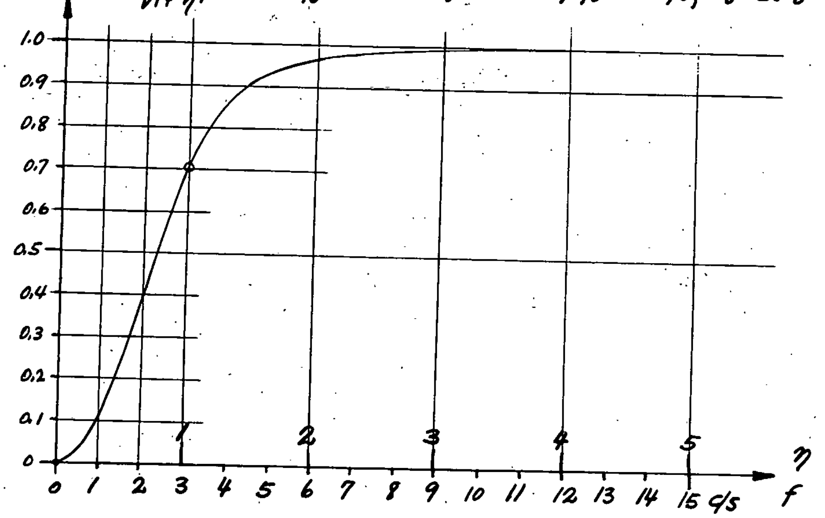
Frequency - Characteristic of Dynamic Receiver

Magnifying - Function of Velocity:

$$\frac{V}{V_0} = \frac{u}{u_0} = \frac{\eta^2}{\sqrt{1+\eta^4}} ;\ \eta = \frac{f}{f_0} ;\quad d = \sqrt{2},\ \vartheta = 2\pi,\ f_0 = 3\ c/s,\ u_0 = B l v_0$$



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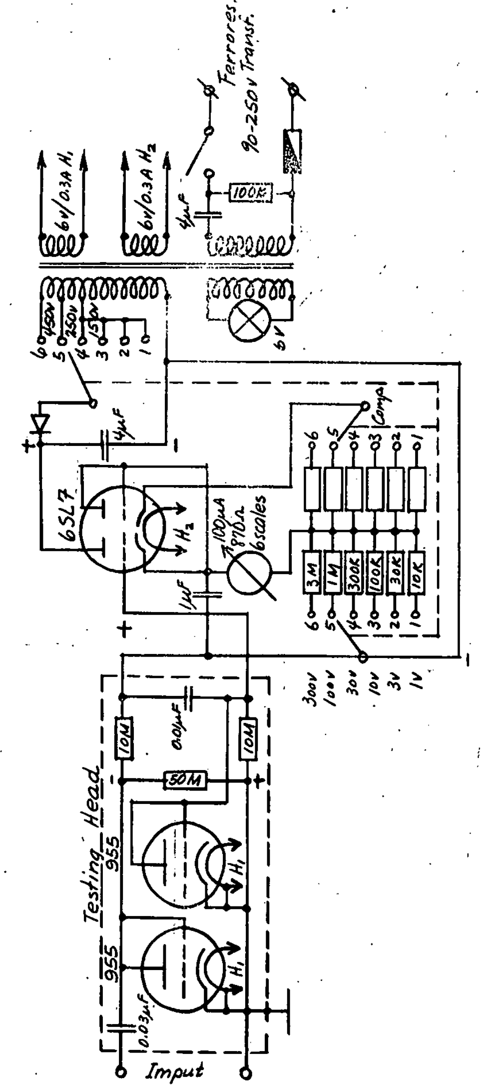

Diode Reflex Voltmeter for ac-Imp.Res. 9MΩ
1-300volts, 5 c/s - 300 Mc/s

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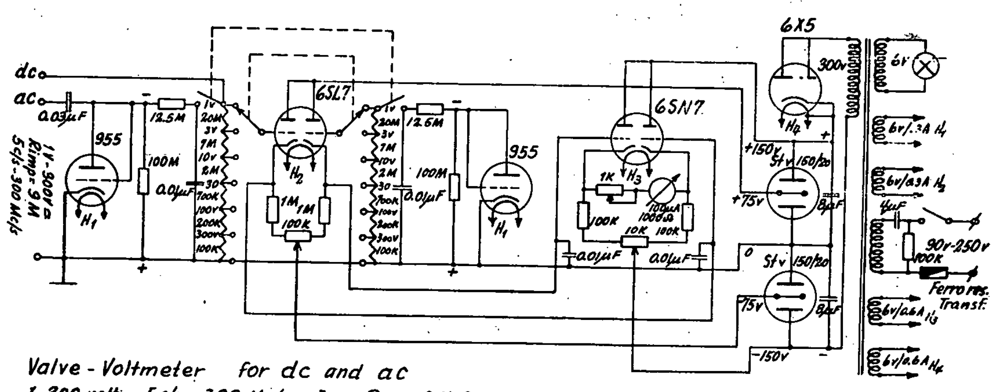

Valve - Voltmeter for dc and ac
1- 300 volt, 5c/s - 300 Mc/s - Imp. Res. : 9 MΩ

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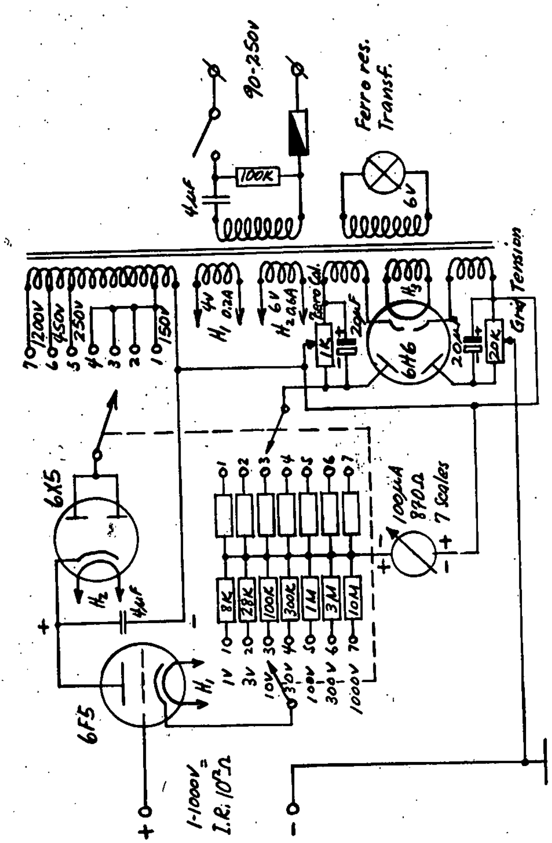

REFLEX VOLTMETER for dc 1-1000 volts
Imp. Res. $10^{12}\Omega$

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